

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a perspective view of the underbody of a vehicle having the floor panel structure of a vehicle body according to a first embodiment of the present invention;

FIG. 2 is a perspective view showing the floor panel structure of a vehicle body according to the first embodiment of the present invention;

FIGS. 3A, 3B and 3C are schematic sectional views ~~FIG. 3 is a schematic sectional view~~ of a floor panel with the vibration reducing structure, a plot of rigidity and a plot of the strain energy distribution according to the first embodiment;

FIG. 4 is an enlarged view showing the groove and damping material in the vibration transmission-reducing structure according to the first embodiment;

FIG. 5 is a schematic sectional view of a floor panel in which additional damping material is added to the floor panel of FIG. 3;

FIG. 6 is an enlarged view showing one example of the corner of the groove according to the first embodiment;

FIG. 7 is an enlarged view showing another example of the corner of the groove according to the first embodiment;

FIGS. 8A and 8B are perspective sectional views ~~FIG. 8 is a perspective sectional view~~ of experimental models used to describe the vibration blocking characteristics of the vibration reducing structure according to the first embodiment;

FIGS. 9A and 9B are plots ~~FIG. 9 is a plot~~ of the experimental results obtained from the experimental models of FIG. 8;

FIG. 10 is a plot of the experimental results obtained from the experimental models of FIG. 8;

FIG. 11 is a schematic view showing a strut suspension system;

FIGS. 12A and 12B are schematic views ~~FIG. 12 is a schematic view~~ showing the cancellation of sound emitted by the floor panel with a vibration mode adjusting structure according to the first embodiment;

FIG. 13 is a top view showing another example of the vibration mode adjusting structure according to the first embodiment;

FIGS. 14A, 14B, 14C, 14D, 14E, 14F, and 14G are sectional views ~~FIG. 14 is a sectional view~~ showing variations of the floor panel structure of a vehicle body according to the first embodiment;

FIG. 15 is a sectional view showing a further variation of the floor panel structure according to the first embodiment;

FIG. 16 is a partial sectional view showing a first variation of the groove which is the vibration reducing structure or vibration blocking area of the first embodiment;

FIG. 17 is a partial sectional view showing a second variation of the groove which is the vibration reducing structure or vibration blocking area of the first embodiment;

FIG. 18 is a partial sectional view showing a third variation of the groove which is the vibration reducing structure or vibration blocking area of the first embodiment;

FIG. 19 is a perspective view showing the floor panel structure of a vehicle body according to a second embodiment of the present invention;

FIG. 20 is a partially enlarged view showing a first floor panel according to the second embodiment;

FIG. 21 is a sectional view showing the sectional structure of the floor panel in the vehicle crosswise direction along A-A of FIG. 19;

FIG. 22 is a sectional view showing the cross-sectional structure of the floor panel in the vehicle body lengthwise direction along B-B of FIG. 19;

FIGS. 23A, 23B, and 23C are schematic sectional views ~~FIG. 23 is a schematic sectional view~~ of a floor panel, a plot of rigidity and a plot of the strain energy distribution according to the second embodiment;

FIGS. 24A, 24B, and 24C are schematic sectional views ~~FIG. 24 is schematic sectional views~~ showing a conventional floor panel that is flat over its entire surface (FIG. 24A), a conventional floor panel that has damping material attached to the entire surface of its curved surfaces and planar areas (FIG. 24B), and a floor panel (FIG. 24C) according to the second embodiment, in order to describe the vibration-reducing characteristics of the second embodiment of the present invention;

FIG. 25 is a plot showing the vibration-reducing characteristics according to the second embodiment of the present invention;

FIG. 26 is a schematic sectional view of a floor panel having the floor panel of FIG. 23 to which additional noise-absorbing material is applied;

FIG. 27 is an partially enlarged view of the planar areas and damping material of the vibration reducing or blocking structure of the second embodiment;

FIG. 28 is a perspective view showing the floor panel structure of a vehicle body according to a third embodiment of the present invention;

FIGS. 29A and 29B are partially enlarged sectional views ~~FIG. 29 is a partially enlarged sectional view~~ of a floor panel used to describe a first method of installing damping material in the first embodiment;

FIG. 30 is a partially enlarged sectional view of a floor panel used to describe a second method of installing damping material in the first embodiment;

FIG. 31 is a partially enlarged sectional view of a floor panel used to describe a second method of installing damping material in the second and third embodiments; and

FIG. 32 is a partially enlarged sectional view of a floor panel used to describe a third method of installing damping material in the first embodiment.